CLAIMS

1. A method for measuring parameters which describe a particle size distribution of particles in a liquid, which method comprises the steps of
- performing a series of reflection measurements, in each of which a signal beam is generated in the liquid and a value (A) of a property of a reflection on a particle in the signal beam is measured;
- performing a maximum likelihood estimation of the parameters in view of a combination of the measured values (A), on the basis of an expression for a probability of the measured values as a function of the measured values, which expression contains a first factor (P) for the probability of a reflection measurement of which a reflection with the measured value forms part, corrected with a second factor (Q) for the probability that there is not also a reflection with a dominating value of the property, which would mask the measured value, forming part of the reflection measurement.

2. A method according to claim 1, wherein the first factor (P) comprises the particle size distribution, smeared with a probability distribution that a particle of a particular size leads to a reflection measurement of which a reflection with the measured value forms part.

3. A method according to claim 1 or 2, wherein the second factor (Q) comprises the probability that a reflection with a value other than the measured value forms part of a reflection measurement, integrated over a range of other values than the measured values.

4. A method according to claim 3, wherein the second factor substantially corresponds to $\exp(- C \int dA' \int dD\ f_D(D)\ G(A' \mid D))$, wherein D is a particle size, C is a concentration of the particles, $f_D(D)$ is a density of particles of particle size D, and $G(A \mid D)$ is the conditional probability that a reflection with amplitude A is detectable, if a particle of a size D yields a detectable reflection.

5. A method according to any one of the preceding claims, wherein the maximum likelihood estimation comprises performing counts of numbers of reflection measurements in which the measured values fall into respective value intervals, and the estimate is chosen such that a complex of deviations between the counts in the different intervals and the counts predicted according to the probability as a function of the measured values is minimized.

6. A method according to any one of the preceding claims, wherein in the reflection measurements a distinction is made between different types of particles that cause the reflections, and in performing the maximum likelihood estimation the expression is corrected with a product of respective second factors for the probability that there is not also a reflection with a dominating value of the property by respective types of particles, which would mask the measured value, forming part of the reflection measurement.

7. An apparatus for measuring parameters which describe a particle size distribution of particles in a liquid, which apparatus comprises

- a liquid channel;
- means for generating an ultrasonic beam in the liquid channel;
- means for measuring a property of a reflection of the beam on a particle in the liquid channel;
- a processing unit arranged for performing a maximum likelihood estimation of the parameters, in view of a combination of the measured values, on the basis of an expression for a probability of the measured values as a function of the measured values, which expression contains a first factor for the probability of a reflection measurement of which a reflection with the measured value forms part, corrected with a second factor for the probability that there is not also a reflection with a dominating value of the property, which would mask the measured value, forming part of the reflection measurement.

8. A computer program product with instructions for measuring parameters which describe a particle size distribution of particles in a liquid, on the basis of a series of reflection measurements, in each of which a signal beam is generated in the liquid and a value (A) of a property of a reflection on a particle in the signal beam is measured; which instructions are arranged for performing a maximum likelihood estimation of the parameters in view of a combination of the measured values (A), on the basis of an expression for a probability of the measured values as a function of the measured values, which expression contains a first factor (P) for the probability of a reflection measurement of which a reflection with the measured value forms part, corrected with a second factor (Q) for the probability that there is not also a reflection with a dominating value of the property, which would mask the measured value, forming part of the reflection measurement.